

Distance from middle of schooner to middle of waterspout on the horizon, measured on the photograph, 48 mm.

Angular distance subtended by the sight lines at the camera, as determined by the local survey, 5.44° .

Hence, 1 mm. subtends $5.44^\circ \div 48 = 0.1133^\circ = 6.80' = 6' 48''$.

The distance moved by the waterspout from the beginning of the first appearance at 12:45 p. m. to the end of the third appearance at 1:28 p. m. can be found as follows:

The positions of the schooner and the waterspout at the time of taking Chamberlain's three photographs are shown on the chart (see fig. 25), as nearly as can be determined; 2d A, at 1:02 p. m.; 3d A, at 1:20 p. m.; 3d B, at 1:24 p. m. In the interval, 1:02 to 1:24 p. m., 22 minutes, the schooner moved about 0.65 mile. This is at the rate of 1.7 miles per hour. The schooner was sailing nearly east-southeast, and the sails were set to catch a wind from the northwest. The wind was very light at the time, as stated by several observers, and as is shown on the photographs by the smoothness of the water. In the interval, 12:45 to 1:28 p. m., 43 minutes, the vessel passed over the distance 1.27 miles. Similarly, the waterspout passed over the distance 0.4 mile in the interval, 1:02 to 1:24 p. m., and over the distance 0.78 mile, or 4018 feet, in the interval, 12:45 to 1:28 p. m., while the whole phenomenon was in evidence. This is at the rate of 1.10 miles per hour.

It is instructive to compare these results with the estimated dimensions and distances as reported by different spectators. Mr. Hanes estimated the eastward progress as 2 miles, diameter from 100 to 300 feet, height 4000 to 5000 feet. Mr. North made the distance of the waterspout from Cottage City 20 miles, or more, supposing that the foot of the vortex was beyond the horizon, and that from his view-point the base of the tube was 20 feet above the sea level; he made its eastward movement about equal to its own height before it disappeared, which is nearly correct, and called this one mile. Mr. Coolidge, October 19, 1896, estimated the height of the spout at from 6000 to 10,000 feet, or 21 to 28 times its diameter, and the latter at 300 to 375 feet and the distance 8 miles. Mr. Coolidge, September 1, 1897, made it 400 to 600 feet in diameter at its mid-height, from 4000 to 6000 feet, or perhaps 10,000 feet high, and 5 miles distant. The observers on the yacht *Avalon*, which was very near the waterspout, made the diameter 100 feet. Mr. E. H. Garrett estimated over 300 to nearly 500 feet high, and 125 feet in diameter; Mr. John B. Garrett; 6 miles distant, height, 750 feet; diameter, 125 feet; height of cascade, 125 feet; Mr. Abbott; height, 3000 to 4000 feet.

[The treatment of this waterspout will be continued in Sections VII, VIII, and IX.]

CLIMATOLOGY OF PORTO RICO FROM 1867 TO 1905, INCLUSIVE.

By Mr. WILLIAM H. ALEXANDER, Observer, Weather Bureau. Dated Burlington, Vt., April 23, 1906.

OROGRAPHY AND TOPOGRAPHY.

On pages 522-523 of the MONTHLY WEATHER REVIEW for November, 1902, under the heading "The Climatology and Water Power of Porto Rico", may be found a few appropriate remarks introductory to this discussion, particularly as regards the topography of the island. Subsequent to the date of that paper the following places of interest were visited for the purpose of securing additional data: Rio Piedras, Caguas, San Lorenzo, Cidra, Cayey, Aibonito, Coamo, Barranquitas, Barros, Comerio, Bayamon, Carolina, Canóvanas, Fajardo, Hacienda Perla, Manati, Ciales, La Isolina, Morovis, El Yunque, Camuy, Quebradillas, Isabela, Aguadilla, Hacienda Coloso, Aguada (the reputed landing place of Columbus in 1493), Añasco, Mayagüez, Las Marias, Cabo Rojo, San German, Lajas, Hacienda Amistad, Guanica (the landing place of General Miles in 1898), Yauco, Ponce, La Carmelita, Adjuntas, San Salvador, Utuado, and Arecibo. The information thus gained

seems to warrant a few additional observations relative to the physical features of the island. (See Chart VII.)

In the first place, careful barometric (aneroid) readings made during the journey to the summit of El Yunque (universally regarded as the highest point on the island) seem to indicate beyond a doubt that the true elevation of that mountain is not more than 3300 feet, instead of 6000 as frequently stated in old records. Again, just north of Ponce in the vicinity of La Carmelita, the same barometer gave as the correct elevation of the dividing ridge 2428 feet. It seems proper, therefore, to amend a former statement to the effect that "the dividing ridge varies in height from 2500 to 3670 feet" so as to make the variation from about 2000 to 3300 feet. This dividing ridge from El Yunque to Humacao is known as "Sierra de Luquillo"; from Humacao to Aibonito, "Sierra de Cayey"; and from Aibonito westward, "Cordillera Central". The two most important depressions in this divide are where the San Juan-Ponce Military Road crosses it, between Aibonito and Coamo, and where the Ponce-Arecibo Road crosses, just south of Adjuntas. Just west of Adjuntas there is an abrupt rise in the range second in importance only to El Yunque. The central figure in this group is known as Mount Guilarte which is very nearly as high as El Yunque. This is the true culminating point to the westward, and from a topographic point of view is the dominating factor in the climatology of the west end of the island. From Mount Guilarte a number of rugged spurs or dividing ridges branch off; one toward the northwest corner of the island; one toward the southwest, terminating near Cabo Rojo; and one between these in the direction of the little village of Rincon.

As to the secondary topographic features of the island, no better description, perhaps, can be given than that of Mr. Herbert M. Wilson in Irrigation Paper No. 32, U. S. Geological Survey, page 14. He says:

Abutting against the foothills of the commanding sierras, and forming secondary topographic features of striking importance, are a number of varied forms found at different portions of the island, and owing their shape and mode of weathering to their geologic origin. On the north coast, between Arecibo, San Juan, and Fajardo, the main summits fall away rather abruptly to elevations of between 1000 and 1500 feet; they then continue as radial spurs, sloping gently to the northward and interrupted by numerous undulations, culminating often in peaks of considerable altitude and prominence.

These are separated by the principal rivers draining the interior, which flow generally to the north, but are deeply indented in the surface of the country. Thus, within five or six miles to the north of the main summits the river bottoms are at altitudes of about 1000 feet, while the summits of the ridges above are at elevations of 2000 to 2500 feet. Again, within five miles of the coast the river beds are at elevations of 50 to 100 feet above sea level, while the summits of the dividing ridges reach altitudes of 1000 to 1500 feet. These dividing ridges are often maintained to the ocean shore, are high, narrow, and A-shaped, and are separated from one another by deep V-shaped valleys, eroded by numerous streams flowing in every direction throughout the interior of the island.

The coastal topography is more simple and consists in the main of playas, or level plains, that in places extend some five or six miles up the river valleys. The playas do not extend in unbroken continuity around the island, but are interrupted in several places. For instance, at the northeast corner of the island spurs from the Sierra de Luquillo plunge directly into the sea; on the northwest corner there is a coral plateau extending from Arecibo to Aguadilla that juts right out to sea. The south and southwest coasts are peculiar in that the playas are separated from the sea by low-lying limestone hills, which are more pronounced along the southwest coast.

From the above, it would seem that waterfalls must of necessity be common in the rivers of the island. There are many falls and some of considerable importance, especially in the Rio de la Plata and the Arecibo. The river channels lend themselves to dam construction so readily as to make this a matter of comparatively small expense. Springs abound in

Porto Rico and many of them are valuable for their mineral and medicinal properties, while others afford warm baths. Among the most noted are the Coamo Springs, near the town of that name; the warm mineral springs near San Sebastian; the mineral springs at San Lorenzo; the hot springs near Aguas Buenas; and the sulphur baths near Ponce. There are no lakes of importance in the island, the only approach to a lake being in the vicinity of Guanica, where there is a considerable body of water lodged in the lowlands between the coast hills and the foothills of the mountains. There are numerous caves, some very interesting and extensive, and in some cases these afford valuable fertilizing material.

TEMPERATURE.

Excessive temperatures are unknown in Porto Rico, as may be seen from the tables herewith. Referring to Table 1, it will be observed from column headed "24-hour mean" that the annual range of monthly means is only about 5° for the year and Tables 3 and 5 indicate an extreme secular range at San Juan of 45°. The interior mountain stations occasionally, though rarely, report a minimum temperature of 50°, from which it may be assumed that the range for the island is about 50°. Frosts never occur in Porto Rico, although the natives are sometimes heard to speak of the "rigors of winter", indicating an extreme sensitiveness to temperature changes. From December to April, inclusive, the monthly mean temperature is below the annual mean, and during the remainder of the year is above. January has the lowest and August the highest mean temperature, although there is only 5.1° difference. The maximum temperatures for the year usually occur in May, when the sun's rays are about vertical, at which time the temperatures are often very trying. August has the highest mean temperature, but September has the highest mean maximum temperature. The average daily range of the temperature at San Juan is between 11° and 12°,¹ but some interior stations have much greater ranges. The records seem to indicate a decrease of about 4° for each 1000 feet of ascent. The minimum temperature for the day generally occurs about 5 a. m. and the maximum anywhere from 10 a. m. to 2 p. m. The rise in temperature from 6 to 10 a. m. is very rapid, but the fall is more gradual.

RAINFALL.

The rainfall and its distribution over the island constitute the most interesting feature in its climatology, as here we find a variety surpassed only by that of its topography. Local climatic differences, due to peculiar physical features, are apparent in the rainfall of the various sections of the island.

The distribution of the rainfall through the twenty-four hours of the day is fully indicated in Tables 7 and 8. In Tables 9, 10, and 13 are presented data for three selected stations designed to show the amount and its distribution through the year. Three stations were selected because no one seems to be sufficiently representative of the island, as a whole, and these three particular stations were selected because they possess the longest and most reliable records on the island. The San Juan records extend back to 1867, with two or three short breaks; the record at Canóvanas Sugar Factory, though not so long, is continuous and entirely trustworthy, and fairly representative of the sugar belt on the north side. The Perla record is even shorter than the Canóvanas record, but it is representative of the mountain districts where the coffee interests lie.

We note, first, that February is by far the driest month in the year. The so-called dry season begins about November 20 and extends to about April 15 when the rainy season sets in. The rainy season has two periods of maximum fall, one in July and the other in November. By far the greater proportion of the rain falls from May to November, inclusive. The average number of rainy days for the year is 194 at Canóvanas,

208 at San Juan (for the four years 1899-1902, inclusive), and 260 at Perla. There is a marked difference in the range of the monthly means at the three stations under consideration. For instance, at Perla the means ranged from 2.39 inches in February to 17.69 inches in November, a difference of 15.30 inches; at Canóvanas the means ranged from 1.80 inches to 11.47 inches, a difference of 9.67 inches; at San Juan there is a range of 3.92 inches in the first set of means and 5.60 inches in the second set. There is a substantial agreement in the February means at all three stations. There is not a single month in the San Juan or Perla record when no rain was recorded and only one, February, 1896, in the Canóvanas record.

The yearly means at San Juan and Canóvanas are practically the same, but at Perla, which is about 500 feet above sea level and on the windward side of El Yunque, there is an increase of more than 60 inches over that of the other two stations. The secular ranges in the annual amounts recorded at the three stations are 46.02 inches at San Juan, 41.70 inches at Canóvanas, and 63.85 inches at Perla.

The distribution of the rainfall over the island becomes an easy inference from what is here said relative to the physical features and the prevailing winds of the island. Available data seem to indicate for the east coast an annual fall of about 92 inches; for the north side, about 86 inches; for the west side, about 86 inches; and for the south side, about 57 inches. There are two places where the fall is considerably in excess of other portions of the island, namely, in the vicinity of El Yunque in the northeast and in the vicinity of Mount Guilarte in the southwest. A careful inspection of the records of stations situated along the north coast shows a gradually diminishing rainfall from Perla to Isabela. A line of central stations, beginning, say, with Humacao, indicates a diminishing fall westward to about midway of the island after which there is an increase until the western culmination (Mount Guilarte) is passed. The fall along the south coast, beginning, say, with Central Aguirre, decreases westward as far as Ponce and then increases quite rapidly. Ponce and vicinity, therefore, seem to constitute the driest portion of the island. In fact the entire south side is subject to frequent and sometimes prolonged droughts, making irrigation quite necessary, for which purpose the supply of water seems to be ample. This difference in the rainfall of the north and south sides is very apparent in the vegetation and general appearance of the two sections.

In Tables 12 and 16 will be found data bearing on excessive precipitation. The years therein given may be taken as fairly representative, with the exception of the year 1899, when the island was visited by a hurricane of unusual violence, that of August 8, 1899, known locally as "San Ciriaco". Chart VIII shows the amount and distribution of rainfall over the island during the passage of this storm.

MISCELLANEOUS CLIMATOLOGICAL ITEMS.

Fogs are not uncommon in the interior of the island along the river valleys. Thunderstorms are not very frequent nor are they, as a rule, very violent. In Table 18 we give the San Juan record of thunderstorms for the seven years 1899 to 1905, inclusive. Hail occasionally though rarely accompanies these thunderstorms. An instance of this occurred at Caguas on April 12 and 13, 1903. See MONTHLY WEATHER REVIEW for April, 1903, Vol. XXXI, page 233.

The winds blow with marked constancy throughout the year, as shown in Table 17. These are the northeast trades modified by local conditions, and at San Juan come quite regularly from the east and are known as the "briza". The evenings are rendered delightfully cool by these winds, and even the hottest day loses its oppressive character to a large degree. The wind is light during the night and fresh during the day. The wind movement is greatest in March and least in October. Destructive hurricanes are rare, as the island is out of the usual path of these disturbances.

¹ This value apparently refers to the nonperiodic range, as the periodic range is 8.6°, as given by Table 1. (See Ward's Hann's "Climatology", pp. 13, 18.)—EDITOR.

TABLE 1.—The mean hourly temperatures, monthly and annual, at San Juan, Porto Rico, based upon a 6-year record, January 1, 1899, to December 31, 1904, inclusive. The readings are from a Richard thermograph, after applying all necessary corrections, read off for each hour of 75th meridian time.

Month.	1 a.m.	2 a.m.	3 a.m.	4 a.m.	5 a.m.	6 a.m.	7 a.m.	8 a.m.	9 a.m.	10 a.m.	11 a.m.	Noon.	1 p.m.	2 p.m.	3 p.m.	4 p.m.	5 p.m.	6 p.m.	7 p.m.	8 p.m.	9 p.m.	10 p.m.	11 p.m.	Mid't.	24-hour mean.†
January	72.5	72.2	71.9	71.8	71.5	71.7	72.8	74.6	77.2	79.6	79.8	80.0	79.9	79.7	79.1	78.3	77.1	76.1	75.5	75.0	74.8	73.7	73.2	72.8	75.4
February	72.5	72.0	71.7	71.4	71.2	71.3	72.8	75.3	78.2	79.6	80.1	80.3	80.6	80.6	80.0	79.4	78.0	76.6	75.8	75.3	74.5	73.9	73.3	72.8	75.7
March	72.1	71.8	71.4	71.2	71.0	71.1	78.2	75.8	78.1	79.1	79.5	80.0	80.0	79.7	79.1	78.4	77.2	76.1	75.4	75.1	74.4	73.8	73.3	72.8	76.4
April	73.5	73.1	72.6	72.6	72.4	73.1	75.4	78.0	79.8	80.6	81.2	81.5	81.7	81.2	80.7	79.9	78.8	77.6	76.8	76.4	75.7	75.2	74.6	74.1	77.0
May	75.0	74.7	74.4	74.2	74.0	75.2	77.8	80.1	81.9	82.4	82.9	83.1	83.1	82.6	82.0	81.4	80.5	79.2	78.3	77.8	77.1	76.5	76.1	75.5	78.6
June	76.5	76.2	75.9	75.6	75.5	76.4	78.7	80.9	82.5	83.0	83.5	83.6	83.8	83.6	82.8	82.1	81.1	80.0	79.0	78.7	78.0	77.7	77.4	77.0	79.6
July	77.2	76.8	76.6	76.3	76.2	77.0	79.0	80.7	82.3	83.1	83.5	83.7	83.6	83.3	82.8	82.3	81.4	80.4	79.8	79.6	79.0	78.8	78.2	77.7	80.0
August	77.6	77.3	77.0	76.7	76.5	77.0	79.0	81.2	82.8	83.7	84.0	84.2	84.4	83.8	83.2	82.6	81.8	80.7	79.8	79.3	78.9	78.6	78.2	77.7	80.4
September	76.9	76.4	76.3	76.0	75.9	76.5	78.6	80.8	83.3	84.1	84.5	84.6	84.2	83.8	83.2	82.4	81.4	80.5	79.7	79.6	78.9	78.3	77.8	77.3	80.0
October	75.8	75.5	75.2	74.8	75.0	75.2	77.6	79.8	82.9	83.7	83.9	83.6	83.5	83.6	82.5	81.6	80.3	79.4	78.7	78.3	77.5	77.2	76.6	75.3	79.0
November	75.0	74.7	74.4	74.1	73.9	74.3	76.2	78.0	81.2	82.0	82.4	82.7	82.8	82.4	81.3	80.6	79.2	78.5	78.0	77.6	76.8	76.3	75.8	75.3	78.4
December	73.5	73.2	72.8	72.7	72.5	72.8	73.9	75.7	79.3	80.5	80.8	81.0	81.2	80.6	80.0	79.1	77.9	76.9	76.5	75.2	74.7	74.2	73.7	73.2	76.5
Year	74.8	74.5	74.2	74.0	73.8	74.1	76.2	78.4	80.8	81.7	82.2	82.4	82.4	82.0	81.4	80.7	79.6	78.5	77.8	77.4	76.8	76.3	75.8	75.3	78.0

† The means in the right-hand column, being found from the hourly temperatures, differ slightly from means for the same series of months and years computed from the data of Table 2; because the latter are based on daily means obtained by the formula, $\frac{1}{2}$ (maximum temperature + minimum temperature), which is used in the regular climatological work of the Weather Bureau.—EDITOR.

TABLE 2.—The monthly mean temperatures at San Juan, Porto Rico, from April, 1872, to May, 1895, under the Spanish Government, and from November, 1898, to December, 1905, under the U. S. Weather Bureau.

Date.	Jan.	Feb.	Mar.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Year.
1872	76.8	76.4	77.0	79.0	80.5	82.5	82.8	83.4	82.4	81.0	78.6	76.6	80.3
1873	76.8	76.4	77.0	79.0	80.5	82.5	82.8	83.4	82.4	81.0	78.6	76.6	80.3
1874	77.0	77.0	77.7	79.3	81.6	83.0	84.2	84.0	83.0	82.0	80.0	77.8	80.6
1875	76.4	76.9	77.6	78.6	81.7	83.8	84.2	83.8	82.9	81.2	80.5	78.2	82.4
1876	79.0	78.2	79.6	81.7	84.6	84.0	84.4	84.8	84.7	82.2	80.2	82.4	83.0
1877	79.5	81.0	81.0	82.0	84.6	86.1	85.6	85.6	84.5	84.1	81.9	79.9	83.0
1878	78.6	78.3	78.8	80.7	81.7	83.7	84.8	83.8	81.0	79.3	77.4	73.8	80.2
1879	78.8	78.3	78.3	79.4	81.1	81.8	82.5	82.0	81.2	80.2	77.9	78.3	79.6
1880	75.9	75.7	77.7	79.6	80.6	81.7	81.9	82.1	82.2	80.7	78.5	76.5	79.6
1881	76.1	75.0	75.7	78.1	80.5	82.6	81.8	82.8	81.9	82.5	79.6	79.2	79.6
1882	77.5	76.4	77.4	79.4	81.5	81.1	81.3	82.5	82.6	81.8	79.4	75.7	79.7
1883	77.1	76.0	79.1	78.0	81.1	82.5	81.7	81.5	81.4	80.6	79.5	76.8	79.6
1884	75.6	75.5	76.0	77.3	80.4	80.5	81.7	82.4	81.7	80.0	80.1	77.8	79.1
1885	74.9	76.2	76.2	77.3	79.1	80.5	80.8	80.3	81.0	79.7	78.5	75.8	78.4
1886	74.3	74.7	75.1	75.8	78.1	79.6	80.8	80.7	81.5	79.9	78.6	75.8	77.9
1887	74.8	74.3	75.0	75.4	77.4	79.2	80.8	80.6	80.7	80.7	79.8	78.8	78.1
1888	76.9	77.1	77.4	78.9	81.6	79.9	80.6	79.7	80.6	80.6	78.7	75.7	79.1
1889	74.4	73.8	74.5	74.8	77.1	78.4	78.7	78.4	78.2	78.8	77.3	77.6	76.8
1890	73.3	73.7	74.6	76.7	77.3	78.9	79.4	79.1	80.1	80.0	77.8	74.8	77.1
1891	72.8	72.8	74.3	74.1	76.1	77.2	78.4	78.4	75.7	76.4	72.8	72.2	75.2
1892	72.1	73.1	72.2	72.5	74.4	75.9	78.9	77.4	77.3	76.5	72.5	74.8	74.8
1893	70.8	70.5	70.4	73.1	71.6	75.7	75.6	76.8	76.8	76.6	74.6	71.6	73.7
1894	69.9	71.1	72.8	74.2	74.6	76.1	76.0	76.8	76.7	76.8	74.7	73.0	74.4
1895	71.9	72.6	74.1	74.4	76.4	78.4	80.4	80.4	80.4	80.4	80.4	80.4	80.4
1896	71.9	72.6	74.1	74.4	76.4	78.4	80.4	80.4	80.4	80.4	80.4	80.4	80.4
1897	71.9	72.6	74.1	74.4	76.4	78.4	80.4	80.4	80.4	80.4	80.4	80.4	80.4
1898	71.9	72.6	74.1	74.4	76.4	78.4	80.4	80.4	80.4	80.4	80.4	80.4	80.4
1899	74.6	75.2	74.7	76.6	78.7	79.3	79.7	80.4	80.6	79.5	78.8	76.0	77.8
1900	75.6	75.7	75.8	77.5	79.5	79.6	80.2	80.8	81.2	80.0	78.8	77.3	78.5
1901	75.8	77.0	76.8	75.6	80.2	80.2	79.8	81.2	81.3	80.4	78.4	77.0	78.9
1902	75.4	77.2	75.4	77.4	78.2	79.4	80.3	80.9	80.4	79.8	77.9	77.1	78.3
1903	76.8	76.2	75.6	78.0	80.6	81.8	80.7	80.6	80.4	80.4	78.1	76.4	78.8
1904	75.4	74.8	75.1	76.0	78.8	79.8	79.5	79.0	79.6	79.3	78.7	77.0	77.8
1905	75.4	75.0	70.2	78.3	78.3	80.6	80.2	80.9	80.5	79.8	79.4	77.0	78.4
Mean*	75.8	76.0	74.6	77.1	79.2	80.4	80.1	80.5	80.4	79.9	78.5	76.9	78.4
Dept.*	-2.6	-2.4	-3.8	-1.3	+0.8	+2.0	+1.7	+2.1	+2.0	+1.5	+0.1	-1.5	.....

* The means are for the lustrum 1901-1905. The bottom line gives the monthly departures from the annual mean.

TABLE 3.—The maximum temperatures at San Juan, Porto Rico, for each month from August, 1872, to December, 1895 (Spanish records), and from November, 1898, to December, 1905 (U. S. Weather Bureau records).

Date.	Jan.	Feb.	Mar.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Year.
1872	86	89	87	91	94	96	95	94	94	94	89	87	96
1873	86	89	88	93	92	93	97	94	94	91	91	87	97
1874	85	88	89	91	95	95	95	94	92	92	92	91	99
1875	85	88	89	91	95	95	95	94	92	92	92	91	99
1876	90	88	93	95	98	95	95	95	95	95	91	91	96
1877	90	92	95	95	101	99	96	99	97	96	94	90	101
1878	87	90	90	93	94	97	97	97	97	97	90	87	97
1879	82	81	90	90	93	90	92	92	91	93	93	89	93
1880	90	88	91	93	96	92	94	94	95	93	88	88	96
1881	90	86	85	91	94	94	91	96	95	95	91	91	96
1882	88	85	95	91	94	93	93	96	93	95	92	85	96
1883	88	88	90	94	88	97	94	91	93	94	91	87	97
1884	84	85	85	92	95	90	90	93	91	91	88	89	95
1885	84	87	86	88	90	89	88	88	92	90	88	84	92
1886	84	80	83	84	87	91	88	90	93	90	88	87	93
1887	84	84	85	86	87	88	88	89	90	90	90	90	90
1888	88	88	90	89	88	92	87	90	90	90	87	84	92
1889	82	83	85	83	90	90	88	88	88	89	89	89	90
1890	88	82	89	90	90	91	87	88	88	90	90	84	91
1891	87	84	83	83	86	86	87	90	90	90	87	86	90
1892	84	85	86	84	86	87	87	90	89	91	90	84	91
1893	81	81	82	85	87	88	86	88	88	92	87	87	92
1894	84	84	85	91	87	87	86	86	88	91	88	86	91
1895	84	84	85	91	87	87	86	86	88	91	88	86	91
1896	84	84	85	91	87	87	86	86	88	91	88	86	91

† And other days.

TABLE 3.—The maximum temperatures at San Juan, Porto Rico—Cont'd.

Date.	Jan.	Feb.	Mar.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Year.
	o	o	o	o	o	o	o	o	o	o	o	o	o
1897.													
1898.													
1899.	82	85	82	90	89	91	87	86	91	90	88	85	91
1900.	86	86	89	93	89	91	89	90	93	90	89	87	93
1901.	84	89	87	90	89	90	88	91	92	88	89	86	92
1902.	86	89	85	92	89	91	87	91	88	89	87	86	93
1903.	86	85	83	92	94	89	89	89	90	91	87	85	94
1904.	86	83	84	86	89	89	88	86	88	89	90	85	90
1905.	84	83	86	90	88	90	87	88	89	91	89	86	91
High-t													
(a)...	90	92	95	95	101	99	97	99	97	98	99	92	101
(b)...	86	89	89	93	94	93	89	91	93	91	90	88	94

TABLE 5.—The minimum temperatures at San Juan, Porto Rico—Cont'd.

Date.	Jan.	Feb.	Mar.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Year.
1876...	69	69	68	72	73	73	74	74	73	73	72	70	66
1877...	69	70	71	72	74	75	75	75	75	73	69	69	69
1878...	66	65	69	71	71	73	72	72	69	70	68	65	65
1879...	65	63	66	67	69	66	69	72	70	71	70	67	63
1880...	65	64	65	66	69	72	67	67	67	71	69	65	64
1881...	66	64	65	65	69	72	72	73	69	72	68	69	64
1882...	68	64	66	68	70	69	68	68	67	71	68	67	64
1883...	64	65	66	65	68	71	70	68	70	68	70	66	64
1884...	66	63	64	64	70	72	73	69	73	70	71	67	63
1885...	63	67	68	68	69	70	73	69	72	70	68	67	63
1886...	66	65	63	67	69	72	72	73	73	71	69	66	63
1887...	65	64	63	65	67	71	73	70	72	72	70	69	63
1888...	66	66	65	70	69	70	72	72	70	72	69	67	65
1889...	66	66	63	65	69	69	70	69	68	68	68	64	63
1890...	65	64	64	66	68	65	71	70	70	70	67	62	62
1891...	63	61	64	65	64	65	68	65	62	61	59	56	56
1892...	61	61	61	62	63	65	64	66	65	64	62	62	61
1893...	57	59	57	59	61	64	64	64	65	62	64	58	57
1894...	58	58	60	61	63	66	65	66	65	64	62	58	58
1895...													
1896...													
1897...													
1898...													
1899...	66	66	66	66	63	71	70	71	68	70	67	65	65
1900...	68	66	67	68	69	70	70	70	72	70	70	68	66
1901...	67	67	67	70	70	70	70	71	71	70	70	68	66
1902...	67	66	67	68	68	71	71	71	72	72	69	69	66
1903...	68	69	65	69	66	71	72	71	72	68	70	68	65
1904...	67	66	66	67	70	70	71	68	71	71	72	70	66
1905...	66	67	66	69	70	73	70	70	70	71	70	68	66
Lowst													
(a)...	57	58	57	59	61	64	64	64	62	61	59	56	56
(b)...	66	66	65	66	66	70	70	68	70	68	69	65	65

(a) Lowest during 1872-1895. (b) Lowest during 1898-1905.

TABLE 6.—The dates on which the minimum temperatures were recorded at San Juan, Porto Rico, for each month from August, 1872, to December, 1895 (Spanish records), and from November, 1898, to December, 1905 (U. S. Weather Bureau records).

Date.	Jan.	Feb.	Mar.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1872...								4	6	27	29	14†
1873...	21	26	23	5	30	1†	25	4	24	30	26	21
1874...	9	16	10†	4†	26†	17	3†	15	17†	13	30	14†
1875...	28	17	23	4	14†	26	2	7	9	4	3†	29
1876...	25	4†	15	2	2	15	10	12†	9	31	27	25
1877...	25	3	8	1†	2	2	9	10	7	17	22	18
1878...	31	1†	8†	26	6†	4	31	18	11	28	16	27
1879...	30	26	23†	21	4	30	18	22†	28	11	11	18
1880...	20†	21	4	25	16	16†	19†	28	2	2	11	30
1881...	1†	25	14	10	12	19	31	20†	25	17†	5	15†
1882...	20	28	8	16†	20	10†	31	1	8	12	26	10
1883...	4	8	13	16	1	29	1†	20	20†	19	9	10
1884...	2	3	4	24	2	3†	4	20	25	21	14†	30
1885...	7	27	19	13†	16	4	11	15	26	16	8	6
1886...	17	17	12	3	10	21	31	1	15	29	26	6†
1887...	25	17	4	6	9	29	1	13	20	21	21†	24†
1888...	7	7	26	7	2	16	1	22	3	3	27	10
1889...	7	25	12	5	3	18	6	21	12	8	23	27
1890...	31	28	19	3	3	23	22	25	24	2	30	6
1891...	6	6	7	8	4	6	6	18	30	26	24	6
1892...	20	7	13	22	3	13	28	12	15	18	29	8
1893...	12	6	18	1	23	1	30	6	30	3	28	3
1894...												
1895...												
1896...												
1897...												
1898...	19	28	8	4	1	6	8	20	30	1	19	19
1899...	15	19	7	8	31	1	15	9	2	24	29	26
1900...	28	13	19	1	25	15	6	22	25	3	26	14
1901...	25	3	31	28	16	16	23	31	15	31	23	20
1902...	3	17	12	14	3	25	10	22	28	21	28	3
1903...	20	25	2	4	14	25	31	12	4	22	30	21
1904...	17	23	19	3	9	5	10	6	29	28	28	26

† And other days.

TABLE 7.—The amount of rain, in inches, that fell during each hour of the day, 75th meridian time, for each month* of the year 1902, at San Juan, Porto Rico (from U. S. Weather Bureau records).

Month.	0 to 1 a. m.	1 to 2 a. m.	2 to 3 a. m.	3 to 4 a. m.	4 to 5 a. m.	5 to 6 a. m.	6 to 7 a. m.	7 to 8 a. m.	8 to 9 a. m.	9 to 10 a. m.	10 to 11 a. m.	11 to 12 noon.	Noon to 1 p. m.	1 to 2 p. m.	2 to 3 p. m.	3 to 4 p. m.	4 to 5 p. m.	5 to 6 p. m.	6 to 7 p. m.	7 to 8 p. m.	8 to 9 p. m.	9 to 10 p. m.	10 to 11 p. m.	11 to Mid't.	Total 24 hrs.
January...	.46	.33	.27	.54	.77	1.16	.21	.55	.32	.02	1.54	.74	.40	.26	.10	.17	.49	1.65	.48	.40	.27	.98	.22	.12	12.45
February...	.00	.00	.00	.00	.00	.00	.00	.01	.00	.00	.00	.00	.00	.00	.08	.00	.00	.00	.00	.00	.00	.00	.00	.00	0.09
March...	.11	.78	.36	.15	.24	.19	.04	.06	.04	.24	.02	.07	.20	.00	.11	.01	.01	.10	.00	.05	.31	.64	.30	.05	4.08
April...	.81	.08	.02	.17	.30	.54	.55	.12	.04	.01	.21	.23	.23	.16	.21	.60	.75	.41	.05	.05	.21	.27	.04	.24	6.30
May...	1.10	1.08	.79	.00	.00	.26	.01	.09	.02	.03	.79	.08	1.82	1.43	2.07	.68	.64	.05	.33	.03	.59	1.09	.74	.13	13.76
June...	.44	.19	1.29	1.13	1.19	.37	.22	.24	.05	.31	.09	1.78	.79	.27	.34	.70	.60	.64	.69	.15	.16	.22	.11	.25	12.22
July...	.15	.03	.47	.25	.05	.14	.17	.09	.00	.05	.51	.85	.03	.00	.17	.06	.04	.01	.21	.18	.00	.10	.39	.66	4.61
August...	.07	.19	.03	.09	.20	.13	.07	.08	.06	.10	.76	.16	.99	.41	.00	.01	.89	.09	.30	.03	.00	.00	.00	.00	4.66
September...	.12	.28	.02	.06	.31	.10	.01	.00	.00	.01	.38	.66	.42	.33	.32	.19	.05	.31	.49	.02	.20	.08	.13	.36	4.85
October...	.01	.02	.07	.00	.05	.04	.09	.03	.04	.09	.14	.03	.26	.01	1.42	.61	.12	.00	.00	.05	.00	.01	.02	.02	3.13
November...	.58	.10	.20	.12	.12	.16	.35	.00	.00	.13	.03	.06	.03	.21	.54	.39	.42	.36	.05	.27	.63	.35	.40	.83	5.83
December...	.04	.15	.14	.24	.23	.30	.32	.41	.98	.23	.32	.00	.95	.22	.01	.83	.29	.32	.03	1.36	.38	.01	.07	.06	6.99
Total.....	3.89	3.23	3.66	2.75	3.46	3.39	2.04	1.68	1.55	1.22	4.79	4.66	3.44	3.69	4.73	5.64	4.34	4.53	2.35	2.89	2.19	3.25	2.77	2.83	78.97
Percentage..	5	4	5	3	4	4	3	2	2	2	6	6	4	5	6	7	5	6	3	4	3	4	4	4	100

* The "rainfall month" in this table is counted from midnight to midnight, 75th meridian time.—Editor.

TABLE 8.—The number of times that .01 inch, or more, of rain fell during each hour of the day, 75th meridian time, for each month of the year 1902, at San Juan, Porto Rico (from U. S. Weather Bureau records).

Month.	0 to 1 a. m.	1 to 2 a. m.	2 to 3 a. m.	3 to 4 a. m.	4 to 5 a. m.	5 to 6 a. m.	6 to 7 a. m.	7 to 8 a. m.	8 to 9 a. m.	9 to 10 a. m.	10 to 11 a. m.	11 to 12 noon.	Noon to 1 p. m.	1 to 2 p. m.	2 to 3 p. m.	3 to 4 p. m.	4 to 5 p. m.	5 to 6 p. m.	6 to 7 p. m.	7 to 8 p. m.	8 to 9 p. m.	9 to 10 p. m.	10 to 11 p. m.	11 to Mid't.	Total 24 hrs.
January.....	6	6	8	7	6	5	5	6	6	4	2	2	3	2	3	6	5	7	3	3	5	2	4	3	106
February.....	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	2
March.....	3	5	5	4	1	3	1	4	1	2	2	1	2	0	1	1	1	2	0	3	3	3	2	2	52
April.....	2	3	2	3	4	5	5	4	1	1	1	3	3	2	4	3	2	4	3	1	2	3	2	2	65
May.....	3	2	2	0	0	2	1	3	1	2	5	2	2	6	8	8	5	6	2	3	1	3	5	3	75
June.....	5	5	7	8	7	5	5	4	2	4	3	7	4	5	5	3	5	8	7	3	3	3	4	3	115
July.....	5	2	6	6	2	4	3	4	0	2	3	3	1	0	1	2	2	1	4	2	0	2	3	7	65
August.....	2	3	2	2	3	4	2	2	3	3	3	3	2	3	0	1	1	2	2	3	0	0	0	0	46
September.....	1	3	2	4	3	2	1	0	0	1	3	4	2	3	2	2	2	1	3	2	3	2	2	5	53
October.....	1	1	1	0	2	3	2	1	1	2	3	2	3	1	4	2	1	0	0	1	0	1	1	1	34
November.....	5	4	2	3	2	5	3	0	0	3	2	2	2	3	3	4	5	5	2	3	2	3	6	5	74
December.....	2	3	5	5	4	6	4	4	4	3	4	0	2	1	1	6	5	6	2	3	3	1	3	3	80
Totals.....	35	37	42	42	31	44	32	33	17	25	31	30	26	26	33	38	34	42	28	27	22	23	32	34	767

TABLE 10.—*The rainfall, in inches, at Canóvanas, Porto Rico, for each month from August, 1889, to December, 1905, and the monthly and annual averages for 16 years, 1890 to 1905, inclusive.*

Date.	Jan.	Feb.	Mar.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Year.
1889.													.....
1890.	13.14	3.70	4.77	5.13	2.45	2.25	7.59	5.58	5.40	2.46	3.69	9.64	65.80
1891.	6.15	3.10	0.22	4.34	2.07	8.48	15.69	19.13	7.27	6.35	14.89	6.72	98.91
1892.	1.69	1.04	1.28	3.05	12.23	6.90	7.17	4.08	7.71	6.16	12.63	6.30	66.24
1893.	0.92	7.23	1.81	4.77	5.73	4.79	10.93	6.00	3.34	2.76	2.89	9.63	54.30
1894.	1.91	2.78	2.68	4.59	7.43	4.60	6.16	3.05	5.60	8.28	7.51	9.18	63.76
1895.	3.98	0.84	2.72	12.75	9.87	7.38	6.33	6.78	6.77	8.64	12.71	17.28	96.00
1896.	2.79	0.00	3.15	2.60	8.81	7.87	12.64	12.99	4.46	3.35	20.82	5.61	85.09
1897.	9.30	0.50	0.42	0.64	15.74	2.92	10.45	4.41	6.47	1.59	11.83	8.09	71.86
1898.	4.81	0.54	0.25	1.01	3.16	3.40	24.57	12.10	7.08	5.33	12.76	4.97	79.57
1899.	4.11	1.37	5.00	11.77	2.27	8.01	10.20	12.58	8.76	5.03	22.22	3.23	94.55
1900.	5.54	1.94	1.62	9.49	5.57	10.85	9.49	11.01	5.55	15.33	5.97	4.09	86.45
1901.	2.98	0.10	6.33	0.41	4.34	9.93	17.43	6.63	10.81	11.89	10.65	5.77	87.27
1902.	8.04	0.28	6.47	10.47	12.70	13.87	6.10	3.34	5.91	1.91	11.49	6.59	87.17
1903.	2.19	1.79	1.34	3.70	0.93	5.04	8.88	11.33	5.57	5.63	6.85	15.08	68.33
1904.	3.53	4.80	7.40	3.80	2.08	3.89	9.42	10.23	8.19	10.08	7.91	9.92	74.53
1905.	8.33	2.03	5.38	2.77	10.25	2.51	6.33	12.21	8.83	9.82	6.55	3.18	78.19
Average ages	4.96	2.00	3.15	5.08	6.60	6.40	10.59	8.84	6.73	6.54	10.65	6.72	78.31

Date.	Jan.	Feb.	Mar.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Year.
1867						6.09	3.23	2.48	2.24	5.08	9.90	1.79	.....
1868	2.40	1.22	2.38	4.42	0.83	1.36	3.91	3.34	6.36	12.96	5.31	1.25	45.77
1869	5.46	2.60	2.23	3.92	1.48	4.13	7.99	7.06	5.68	6.14	7.39	4.47	58.15
1870	4.51	0.85	1.95	3.88	5.00	4.95	7.14	5.13	4.45	6.92	10.60	4.70	60.08
1871	4.69	2.36	2.41	5.14	3.72	1.13	6.15	7.66	3.33	8.31	7.67	4.55	57.12
1872	1.52	4.52	1.27	4.17	4.30	5.69	5.31	4.47	5.88	8.53	5.92	5.05	56.33
1873	2.23	2.84	4.45	0.83	3.78	1.04	3.15	4.31	7.21	2.82	2.39	3.20	37.25
1874	2.10	4.33	1.65	1.46	4.39	0.53	3.73	5.91	3.86	4.01	6.61	3.07	46.25
1875	4.69	1.08	2.23	0.58	1.32	2.88	.....	.....	.....	.....	.....	.....	.....
1876													
1877	3.21	5.29	2.60	7.11	0.93	7.32	3.88	3.25	4.68	3.12	7.50	3.20	.....
1878	2.78	1.59	12.41	4.10	10.27	3.17	11.57	5.53	5.39	11.08	6.84	2.03	82.66
1879	3.50	1.45	3.31	11.77	12.25	8.91	5.76	8.40	3.77	4.46	11.73	3.51	79.82
1880	2.59	1.98	0.51	1.62	8.23	4.55	5.26	5.59	3.52	1.97	6.84	2.25	45.81
1881	1.07	2.15	0.41	3.72	5.74	7.00	6.20	5.81	9.54	15.67	8.84	3.30	69.45
1882	2.16	7.93	3.29	1.78	3.61	1.28	8.50	5.52	3.59	1.54	6.63	2.00	46.83
1883	6.05	4.81	3.77	2.06	5.02	5.04	10.16	9.96	3.86	5.65	4.66	17.66	79.10
1884	3.49	3.37	1.39	2.62	6.24	4.43	4.35	4.03	5.93	8.00	3.01	3.98	50.49
1885	2.41	1.21	1.07	1.33	1.98	2.82	3.50	3.50	7.38	6.78	5.91	5.59	43.38
1886	2.66	1.85	6.76	3.95	0.99	6.20	5.86	10.32	3.17	11.91	9.64	6.11	72.42
1887	2.62	3.30	0.48	1.93	5.81	6.52	6.85	3.93	6.13	3.27	8.32	2.28	47.64
1888	2.13	0.93	1.37	4.89	3.88	5.32	2.48	6.53	7.73	4.64	3.40	5.51	48.81
1889	2.35	1.30	1.10	4.50	9.93	12.72	4.45	6.22	7.41	4.68	4.53	4.50	63.19
1890	8.60	2.91	2.69	4.62	1.90	6.19	4.82	5.69	3.15	2.55	2.90	4.88	50.90
1891	1.38	1.24	0.29	1.91	4.91	4.62	5.21	17.07	4.01	8.81	10.90	4.23	64.63
1892	1.89	0.35	1.01	2.10	9.09	2.34	5.56	4.28	4.69	2.96	7.25	1.90	43.42
1893	0.67	3.33	0.42	3.53	2.39	2.67	4.88	6.61	2.73	4.82	1.84	3.25	36.64
1894	1.77	1.08	1.26	2.88	5.74	5.40	7.53	4.45	5.21	3.29	4.44	5.28	48.33
1895	2.93	0.70	1.39	7.37	6.43	1.17	3.30	3.04	2.91	4.12	4.48	4.81	42.65
1896	1.26	0.24	0.76	1.72	1.08								
1897	2.44	0.21	1.54	3.72	6.38	5.35	6.27	7.18	4.06	1.30	4.61	2.45	45.51
1898	1.81	1.24	2.57								12.08	5.30	
1899	2.92	0.80	2.29	6.09	2.59	7.23	7.53	10.38	13.66	10.21	11.81	2.14	77.61
1900	3.93	2.13	1.57	5.92	3.83	7.53	6.33	7.00	8.00	3.05	8.11	4.50	56.23
1901	4.36	0.50	4.60	1.11	4.84	7.05	10.98	8.59	7.39	8.30	9.55	8.45	75.70
1902*	12.45	0.09	4.08	6.09	13.97	12.22	4.61	4.66	4.85	1.33	5.65	7.16	78.99
1903	2.09	1.44	4.26	3.07	4.54	2.18	7.13	8.41	5.13	5.87	6.41	9.48	60.01
1904	4.07	6.48	3.85	3.97	5.03	3.28	4.70	9.87	6.06	3.55	5.83	1.94	58.13
1905	3.95	2.46	3.01	2.29	6.42	6.11	7.60	7.43	7.15	10.25	5.33	2.85	61.35
Means (a) ..	2.96	2.40	2.35	3.77	4.99	4.92	5.88	6.10	5.01	6.15	6.27	4.36	55.16
(b) ..	5.38	2.19	3.86	8.31	6.96	5.47	7.00	7.79	6.12	6.22	6.55	5.97	66.83

Date.	Jan.	Feb.	Mar.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Year.
1889...								16	10	10		23	
1890...	22	15	13	12	9	7	13	15	16	11	15	20	173
1891...	18	15	2	8	9	9	26	18	15	15	21	21	177
1892...	15	5	11	9	17	15	13	18	21	20	25	17	186
1893...	13	25	9	19	21	24	28	17	13	17	11	18	215
1894...	10	9	9	8	18	19	17	18	14	16	29	20	187
1895...	12	7	10	5	15	10	12	11	13	19	17	15	146
1896...	10	0	10	3	15	10	20	20	11	10	21	18	148
1897...	11	4	4	5	15	12	17	19	17	7	25	27	163
1898...	16	3	1	5	7	8	26	22	16	12	22	21	159
1899...	16	10	14	18	8	22	26	18	19	22	25	17	215
1900...	27	13	7	18	15	22	26	24	20	22	23	25	246
1901...	19	4	20	6	14	28	28	23	22	22	14	22	222
1902...	23	1	17	12	14	23	26	14	18	11	20	21	200
1903...	22	17	17	14	8	17	22	22	14	17	19	23	212
1904...	17	21	26	16	11	15	16	22	26	20	18	29	227
1905...	20	22	13	19	25	15	15	20	23	23	20	18	233
Total..	271	171	183	177	221	256	336	305	278	264	325	322	3109
Aver- ages }	17	11	11	11	14	16	21	19	17	16	20	20	194

TABLE 12.—*The dates and the amounts when 2.50 inches, or more, of rain fell within twenty-four hours, at Canóvanas, Porto Rico, from August, 1889, to December, 1905, inclusive.*

Year.	Jan.		Feb.		Mar.		April.		May.		June.		July.		Aug.		Sept.		Oct.		Nov.		Dec.	
	Date.	Amt.	Date.	Amt.	Date.	Amt.	Date.	Amt.	Date.	Amt.	Date.	Amt.	Date.	Amt.	Date.	Amt.	Date.	Amt.	Date.	Amt.	Date.	Amt.	Date.	Amt.
1889.		Ins.		Ins.		Ins.		Ins.		Ins.		Ins.		Ins.		Ins.		Ins.		Ins.		Ins.		Ins.
1890.	16	3. 10																					31	3. 25
1891.													19	4. 47	19	4. 58								
1892.									12	6. 00	23	2. 67												
1893.																								
1894.																		12	3. 40					
1895.							22	8. 75													27	4. 08	1	7. 62
1896.																				28	5. 80	14	2. 56	
1897.	9	2. 83							17	3. 65			12	2. 30	25	2. 51							9	2. 70
1898.	4	2. 60							20	2. 80			7	3. 20	8	2. 70			6	2. 80	8	2. 75		
1899.													9	8. 30			8	7. 15			16	3. 20		
1900.							28	6. 25							31	3. 22			24	2. 60	20	5. 06		
1901.													6	3. 45	11	3. 10			11	3. 40				
1902.	15	2. 60			20	3. 86	21	3. 70	21	2. 75			7	2. 82					11	3. 10				
1903.							22	3. 10									17	5. 29					19	6. 40
1904.																	6	2. 63						
1905.	26	2. 53							2	3. 85									12	3. 10				

TABLE 16.—The greatest daily rainfalls, in inches—Continued.

Year and station.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.
1899.												
<i>South side.</i>												
Aguirre				1.62		1.24	2.19	5.00*	1.56	0.96	1.00	0.23
Coamo							1.25			1.37		
Juana Diaz								11.20	3.31			
Ponce					0.89				2.38 ^b	3.27	0.66	0.36
Yauco						1.12	0.07			1.20 ^f	2.10	0.03
<i>West side.</i>												
Aguadilla				1.60	2.00	1.80	1.30	2.85		1.70 ^g	2.70	0.52 ^a
Amistad							1.45	11.20	5.25	2.70	1.40	0.60
Coloso								6.00		3.90	5.71	0.46
Mayaguez						2.19	2.10	8.40		1.15	1.20	0.60
San German				2.00		2.50				2.05	2.25	0.85
1900.												
<i>North side.</i>												
Adjuntas	1.44	0.23	0.74	3.56	2.70	5.93	2.17	11.54	0.73	2.01	0.50	0.47
Arecibo		0.24	0.92	2.13	1.30	2.70	0.96	1.10	0.60	0.90	2.35	4.00
Bayamon	0.95	0.48	0.61	3.48	2.53	1.55	0.95	2.31	3.22	1.41	3.10	3.70
Caguas	0.30 ^a	0.40	0.28	7.00	5.60	8.05	4.10		1.35			
Canóvanas	1.35	0.40	0.96	6.25	1.80	2.44	1.35	3.22	1.92	2.60	2.40	1.25
Cayey	0.80	0.65	0.25	4.30			2.30 [†]	2.15 ^g		0.85	0.96	0.43
Cidra						2.00	4.32	3.10	2.25	1.70	2.20	0.70
Corozal	2.30	0.50	1.10	2.00	2.20	1.80	1.60	2.00	1.10	2.20	3.80	1.50
Isabela	0.67	0.74	0.24	2.36	0.68	2.66	1.12	2.32		0.30	1.90	1.90
La Isolina	1.46	0.32	1.22	0.76	2.88 ^a		1.86	1.27	3.57	1.38	2.62 [†]	0.82
Manati	0.80	0.60	0.30	2.15	2.87		2.80	1.58	2.90	1.58	2.45	3.10
Morovis	0.86	0.84	0.89	1.80		2.62	0.84	2.14	1.24	2.15		
Perla	1.37	0.63	2.84	10.70	4.09	4.81	2.35		3.16	2.50	1.42	0.78
San Juan	0.75	0.70	0.71	1.91	1.00	2.23	1.19	2.16	1.45	3.35	1.69	0.71
San Lorenzo	0.88	0.51	0.17	8.31	2.05	2.86	7.25	3.11	1.12	2.88	1.21	1.66
Utua			0.25	1.00	2.00	2.08	1.03		0.83	1.61 ^b	2.09	0.48
<i>East side.</i>												
Fajardo	1.00	0.10	1.40	8.45	0.80	3.30	1.50	2.00	3.50 ^a	1.61 ^b	0.50	0.78
Humacao	0.95	0.03	0.83	6.60	5.50	4.84	5.10	1.41	1.27	0.82	0.06	2.00
Maunabo	1.30	0.30	0.92	2.00	1.49	1.90	2.60	1.20	2.00	2.17	1.37	1.29
<i>South side.</i>												
Aguirre		0.60	0.09	2.18	1.65	2.15	4.30	3.40	3.25		0.20	
Coamo	0.12		T.	2.40	3.01	4.00	4.40	4.60	1.09	0.98 ^a	4.00	0.12
Guayama										4.00		
Juana Diaz						2.17	3.00	0.90				0.30
Ponce	0.15 [†]		0.00	1.40	1.64	4.80	4.58	1.08				
Yauco	1.80	0.20	0.06 ^a	0.82	0.87	7.95	3.05	1.08	0.94	1.42	0.55	1.50
<i>West side.</i>												
Aguadilla	0.75 [†]	1.00	0.18	1.52	1.10	2.45	2.02	2.20	1.45	1.15	0.65	1.35
Amistad	1.00	0.60	0.40	0.80	1.40	6.00	2.00	1.20	2.00	1.21	1.41	2.10
Coloso	0.51	0.24	0.45	2.15	1.70	2.31	1.93	2.00	2.17	1.86	0.59	0.70
Mayaguez	0.48	0.85	1.12	1.23	1.97	3.45	2.02	3.00	1.84	2.75	0.65	2.10
San German	0.72	0.22	1.82	0.95 ^a	2.52	6.85	1.30	0.57	1.02	2.04	1.21	
1901.												
<i>North side.</i>												
Adjuntas	1.80	1.13	2.30	0.33	1.55	0.80	2.30		10.00	2.18	4.90	1.65
Arecibo	1.50	0.55	4.00	2.20	1.10	2.50	1.20	1.12	2.10	2.00	8.00	3.00
Barros				0.11	3.50	0.80	5.80	1.35	6.10	2.60	6.80	2.30
Bayamon	0.58	0.23	5.82	0.50	2.46	2.19	1.91	1.68	1.92	1.84	2.37	2.81
Caguas		0.03			1.75	0.71	5.30		2.60	5.00	3.00	0.50
Canóvanas	0.72	0.05	1.28	0.16	1.10	1.12	6.27	1.30	3.10	3.40	2.35	1.40
Cayey	1.27	0.33	1.44	0.47	1.12	4.27	4.52	1.45	6.47	1.70	7.65	0.92
Cidra	2.00	0.35	3.00	0.65	1.25	1.43	3.05	1.18	2.00	1.30	2.24	1.38
Corozal	2.20	2.10	2.30	1.90	1.22	2.20	3.05	1.98	1.98	1.86	3.80	3.40
Isabela	2.60	0.42	2.00	1.85	1.30	2.70	1.28	0.90	3.45	2.53	2.03	3.20
La Isolina	2.85	0.45	5.80	2.00	4.31	2.00	3.50	1.01	4.50	6.60	3.97	4.40
Manati	2.00	0.20	9.32	2.80	1.56	2.80	1.60	1.11	1.85	1.70	3.00	1.61
Morovis	2.18	0.52	8.30	1.91	3.40	1.35	1.87	1.55	5.28	4.23		
Perla	2.32	0.32	2.14	2.28	5.14	3.59	7.02	1.20	8.02	3.36	3.92	2.34
San Juan	1.38	0.42	2.08	0.51	1.49	0.36	4.04	3.10	2.47	1.66	2.85	2.02
San Lorenzo	2.00	0.44	4.14	0.29	1.75	2.00	3.01	1.88	4.13	4.54	5.00	1.49
San Salvador						1.50	3.60	1.45	9.90	2.00	4.08	2.00
Utua	1.42	0.23	5.62	2.95	3.65	1.27	2.04	2.26	8.50	4.55	6.40	1.80
<i>East side.</i>												
Fajardo	3.76	0.62	1.41	0.87	1.68	1.92	7.62	1.24	6.48	1.97	4.05	2.48
Humacao	2.00	0.05	1.37	0.86	3.01	2.20	5.50	1.40	3.30	2.70	3.60	1.50
Maunabo	2.00	0.70	1.21	0.80	7.30		2.34 [†]	1.60	2.50	1.95	2.30	2.00
<i>South side.</i>												
Aguirre		0.52	0.25	0.44	0.70	0.82	2.90 [†]	1.55	2.25	1.89	1.58	
Coamo	8.10	1.40	0.70	1.05	1.85	1.05	4.13	1.23	5.05	1.90		5.00 ^a
Guayama			0.34	0.65		0.90	2.62			1.85	1.39	1.27
Juana Diaz	2.00	0.23	0.58	1.00	1.04	0.46			3.30 ^g	0.90	3.50	0.52
Ponce	0.58	0.55	0.25	0.17	0.52	0.30	2.45	0.68	2.05			0.92
Santa Isabel						0.63	2.78	0.74	6.35	1.30	1.77	0.74
Yauco	0.84	1.05	1.20	0.27	1.05	0.30	2.02	1.30	2.70	1.00	1.04	0.37
<i>West side.</i>												
Aguadilla	1.53	0.54	2.10	2.01	2.00						2.00	1.12
Amistad	0.98	0.67	0.48	0.22	3.27	1.43		1.50	5.30	1.06	2.42	0.67
Coloso	1.00	1.61	5.00	2.23	1.60	1.82	1.80	0.90	3.15	1.21	4.03	1.80
Las Marias							1.13	2.60	3.13	1.70	6.40	0.83
Mayaguez	1.03	0.30	1.80	1.26	1.70	3.62	2.70	3.48	6.24	1.40	4.08	0.66
San German					2.01					1.47	1.94	1.20
1902.												
<i>North side.</i>												
Adjuntas	2.30	0.50	0.24	2.40	2.56	2.00	1.72	2.62	2.10	1.65	1.30	1.22
Arecibo	4.20	0.15	2.20	1.40	2.90	1.20	2.30	2.45	1.65	2.22	1.10	1.10
Barros	4.80	T.	1.15	2.00	4.10	2.70	2.40 ^{aa}	0.55	0.83	0.83	1.68	0.70
Bayamon	2.42	0.02	0.50	2.43	2.42	3.03	1.48	2.50	1.84	2.27	1.97	
Caguas	4.00	0.06	1.00	1.86	2.00	3.15	1.00	1.00	4.00	1.14	0.70	0.80 ^a
Canóvanas	2.60	0.28	3.86	3.70	2.75	2.30	0.90	0.96	2.80	0.65	2.25	1.02
Cayey	1.60	0.12	0.70	1.80	2.03	6.83	0.35	0.49	1.27	1.43	0.97	0.70
Cidra	1.30	0.00	0.75	1.51	1.81	4.91	0.73	0.85	1.00	0.85	0.60	4.30
Corozal	2.90	0.30	1.40	3.25	2.00	2.25 [†]						2.20 [†]
Isabela	5.35	3.10	0.85	1.05	1.50	2.10	0.45	2.96	0.90	1.50	1.40	2.10
La Isolina	3.70	0.52	0.74	2.64	3.40	1.96	0.76 [†]	1.11	1.01	0.72	1.75	1.24
Manati	1.60		1.33	2.10	1.00	2.70	1.29	1.00	0.70	1.05	5.15	0.70
Morovis		0.58		2.40	4.40	1.30	0.70	1.80	1.20	1.80	1.10	0.19
Perla	2.00	0.10	2.50	2.25	3.46	9.66	1.82	3.18		0.93	3.04	5.05
San Juan	3.09	0.08	1.96	2.40	4.82	2.46	1.18	1.61	1.61	1.31	1.91	1.97

TABLE 16.—The greatest daily rainfalls, in inches—Continued.

Year and station.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.
1902.												
North side—Continued.												
San Lorenzo	0.48	0.13	0.89	1.05	2.42	5.55	1.48	1.25	5.30	0.60	.....	2.00
San Salvador	1.80	0.22	0.57	2.00	2.97	2.07	1.65	1.45	2.50	1.08	2.70	2.70
Utua	2.75	0.80	0.50	2.83	2.35	2.75	2.68	0.90	1.77	2.07	3.40	0.85
East side.												
Fajardo	1.70	0.05	0.82	1.50	2.25	3.95	0.66	0.83	2.30	0.70	1.45	0.72
Humacao	1.90	0.30	1.40	2.00	6.01	4.01	0.90	1.84	2.54	1.03	2.00	1.11
Maunabo	1.40	1.10	1.23	2.54	2.70	4.25	1.30	0.85	2.60	1.67	2.32	0.60
South side.												
Aguirre	0.74	0.05	0.29	1.52	1.05	4.50	0.23	1.09	0.85	2.58	1.43	0.98
Coamo	.....	0.29	0.30	1.45	2.10	3.00	0.90	2.50	0.20	1.00	1.75	.....
Guayama	0.67	0.18	0.23	1.76	0.95	6.40	0.28	1.27	1.57	1.83	3.90	0.33
Juana Diaz	0.50	0.21	0.19	1.49	1.87	4.00	0.50	.....	.....	1.47	1.41	0.52
Ponce	0.45	T.	0.07	1.80	1.95	2.50	0.40	0.95	1.10	1.76	0.31	1.30
Santa Isabel	0.71 ^a	0.17	0.12	1.79	1.30	3.40	0.11	0.80	0.95	2.23	1.35	2.44
Yauco	0.50	0.07	0.30	1.97	1.80	2.60	.....	1.80	2.30	0.60	1.35	0.87
West side.												
Aguadilla	2.44	0.72	0.23	1.22	1.28	3.60	0.84	2.70	1.41	1.72	2.22	1.38
Amistad	.....	.....	.....	1.56	1.56	2.00	0.71	0.97	0.82	0.84	1.64	1.81
Coloso	2.00	0.11	0.22	0.95	1.92	2.52	0.98	0.94	2.09	1.33	1.83	0.61
Las Marias	0.79	0.20	0.78	2.26	3.76	1.65	1.83	2.11	3.70	2.95	2.42	2.41
Mayaguez	1.21	0.30	0.06	4.07	4.06	4.05	1.50	1.98	4.07	1.00	1.48	1.16
San German	.....	0.05	0.53	2.20	2.84	1.33	1.86	3.69	1.30	1.05	2.40	2.00
1903.												
North side.												
Adjuntas	1.81	0.24	0.62	1.10	2.21	0.90	1.72	1.60	1.00	2.90	4.60	1.90
Arecibo	0.40	0.40	1.70	0.00	4.00	0.90	0.85	1.00	1.70	1.30	1.50	2.35
Barros	0.10	1.00	0.80	4.15	2.16	0.03	1.10	1.40	2.35	2.05	2.51	4.04
Bayamon	0.19	0.20	0.45	0.87	2.00	0.70	0.60	0.70	0.60	0.95	0.60	1.00
Caguas	0.60	0.30	0.20	2.17	1.27	1.75	0.90	4.00	0.62	3.32	1.50	0.86
Canóvanas	0.40	0.30	0.27	1.10	0.24	0.95	2.03	5.29	1.64	2.05	1.75	6.40
Cayey	0.30	0.52	0.22	0.90	0.15	1.90	2.18	3.80	2.10	2.31	2.60	0.84
Cidra	0.60	0.08	1.90	1.80	0.90	0.80	2.14	4.50	1.00	1.30	0.60	4.00
Corozal	0.15	1.10 ^a	0.86	2.80	2.40	0.80	1.59	.....	.....	2.30	2.25	2.29
Isabela	0.42	0.30	0.73 ^b	4.05 ^b	2.97	1.34	0.53	1.12	1.45	2.40	2.15	2.57
La Isolina	0.20	0.25	1.60 ^a	5.23 ^a	.....	3.03	1.32	2.32	2.67	1.90	3.30	2.84
Manati	0.27	0.24	0.62	3.10	1.30	1.10	1.11	1.45	1.45	2.32	2.60	2.98
Morovis	1.30	0.61	1.40	1.55	2.50	1.80	1.30	1.90	2.10	1.80	1.80	2.20
Perla	0.96	0.43	0.58	2.80	3.50	1.68	2.24	3.74	1.16	3.00	3.36	4.32
San Juan	0.73	0.42	1.29	0.90	1.80	0.66	1.25	3.00	1.16	1.79	1.55	4.50
San Lorenzo	0.43	0.50	0.51	0.91	2.10	1.50	1.50	3.10	1.23	2.05	2.17	1.42
San Salvador	0.13	0.40	0.55	2.10	3.70	1.77	0.87	2.60	3.09	1.65	4.00	3.40
Utua	T.	0.20	1.25	2.05	5.20	3.05	2.00	4.00	2.75	1.20	5.60	3.00
East side.												
Fajardo	0.47	0.30	0.45	0.78	2.05	1.12	2.03	2.47	0.57	2.90	1.40	2.05
Humacao	1.00	1.30	0.17	1.10	2.30	1.50	0.90	2.25	0.99	1.50	1.60	1.65
Maunabo	0.83	0.90	0.40	0.45	1.55	1.50	2.60	2.10	1.10	2.60	1.80	1.00
South side.												
Aguirre	0.22	0.20	0.24	0.52	0.96	1.57	2.69	3.72	0.65	3.00	1.03	0.30
Coamo	T.	0.01	T.	.....	0.65	1.30	2.80	1.50	1.15	1.90	1.95	1.01
Guayama	0.24	.....	0.58	0.45	0.65	2.85	3.10	1.97	1.65	3.31	2.01	0.60
Juana Diaz	.....	.....	0.15	0.65	0.77	0.46	3.30	1.53	.....	.....	.....	.....
Ponce	0.54	T.	0.16	0.40	0.45	0.67	1.66	2.11	2.07	2.25	2.30	0.90
Santa Isabel	0.07	0.12	0.30	0.75	1.45	0.53	3.40	1.20	0.63	2.80	4.00	0.23
Yauco	0.57	1.31	1.71	1.02	2.00	0.41	1.80	0.94	0.69	2.45	2.46	0.94
West side.												
Coloso	.....	0.50	1.36	1.95	1.50	2.25	2.30	0.99	2.03	2.50	2.00	1.83
Las Marias	0.54	0.14	0.90	2.50	1.95	2.10	.....	2.22	3.27	2.85	2.49	1.55
Mayaguez	1.51	0.20	1.03	0.77	2.84	2.90	1.86	1.93	1.84	1.67	3.63	1.26
San German	0.30	0.66	0.67	1.78	1.42	3.55	1.10	2.53	1.20	3.05	5.75	1.05
1904.												
North side.												
Adjuntas	1.15	0.60	2.50	2.10	0.60	0.62	1.06	2.55	1.73	1.75	2.30	0.45
Arecibo	0.45	2.70	1.00	1.70	0.80	0.70	0.80	0.80	1.60	0.81	0.70	1.10
Barros	3.58	2.00	2.35	1.45	0.40	.....	.....	.....	.....	.....	.....	.....
Bayamon	0.90	0.55	2.00	1.00	.....	.....	.....	1.60	1.45	1.20	1.40	1.03
Caguas	0.71	1.30	1.05	2.00	0.67	1.00	1.00	0.90	6.00	1.98	1.95	0.64
Canóvanas	0.80	1.25	1.20	1.50	0.50	0.80	1.72	2.63	1.58	2.80	2.30	0.53
Cayey	1.05	1.15	2.10	1.40	0.47	2.15	4.20	1.10	.....	.....	.....	.....
Cidra	2.30	1.50	3.00	1.90	2.30	2.90	3.45	3.42	.....	.....	.....	3.80
Corozal	1.31	.....	.....	0.97	0.97	.....	.....	.....	0.95	0.90	1.20	0.55
Isabela	0.70	2.94	1.18	2.37	2.09	0.93	0.38	0.57	1.75	1.20	3.70	1.00
La Isolina	0.77	3.40	2.28	2.27	1.04	2.50	1.60	1.18	1.85	0.90	4.70	.....
Manati	0.38	2.00	1.15	0.92	0.78	1.33	1.00	0.60	1.03	1.10	2.60	0.54
Morovis	1.15	1.15	1.20	1.20	0.70	1.70	1.10	.....	.....	.....	1.60	1.10
Perla	1.20	1.52	1.80	2.05	3.56	1.63	2.45	.....	.....	.....	.....	.....
San Juan	0.73	2.66	0.64	1.13	3.22	1.24	1.34	1.83	1.56	1.76	3.01	0.47
San Lorenzo	0.67	1.00	1.20	2.10	0.85	0.90	1.52	2.30	1.95	3.50	1.09	0.25
San Salvador	1.05	0.71	1.33	1.35	0.58	1.42	1.60	3.00	1.36	2.00	3.21	0.68
Utua	2.25	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
East side.												
Fajardo	0.58	0.74	1.89	2.70	0.93	1.73	1.70	1.47	1.96	2.20	1.60	0.58
Humacao	0.55	2.68	0.34	2.00	1.00	2.00	1.58	4.00	2.00	4.46	1.70	0.40
Maunabo	0.55	1.00	2.20	3.21	1.60	0.60	1.99	3.60	1.73	4.80	1.19	0.45
South side.												
Aguirre	0.64	0.34	1.74	0.39	1.43	0.58	0.90	1.21	1.67	2.82	1.34	0.26
Coamo	1.00	0.06	2.00	1.40	0.90	0.60	2.18	0.54	1.28	1.60	1.30	1.15
Guayama	0.28	0.38	3.46	1.11	1.40	1.08	1.30	1.39	1.82	3.26	2.74	0.31
Juana Diaz	.....	0.15	2.15	0.95	0.89	0.81	1.35	0.82	2.16	4.11	2.21	T.
Ponce	0.04	0.46	1.89	.....	2.02	T.	.....	.....	.....	.....	2.54	0.03
Santa Isabel	0.07	0.37	0.72	0.79	4.53	0.33	0.42	1.54	2.25	4.13	1.73	0.38
Yauco	0.45	1.57	1.57	0.75	1.56	0.05	1.62	0.86	1.93	2.73	2.25	0.85
West side.												
Coloso	1.68	2.39	1.52	0.92	3.35	2.11	1.00	1.44	1.69	1.60	3.35	0.80
Las Marias	1.70	0.94	3.07	2.61	1.68	3.19	1.15	3.03	2.72	.....	.....	.....
Mayaguez	1.77	0.70	2.30	3.99	1.53	1.43	2.50	2.52	1.40	2.02	2.69	2.18
San German	0.60	2.25	2.25	2.73	0.50	0.50	0.90	1.80	.....	.....	3.00	1.72
1905.												
North side.												
Adjuntas	1.20	0.70	1.15	2.30	3.10	0.85	1.20	2.12	1.95	2.95	1.26	1.82
Arecibo	1.00	0.70	0.93	0.60	1.40	1.35	1.35	1.17	2.75	2.88	4.09	0.29
Barros	.....	1.75	1.48	1.35	1.70	1.55	1.85	1.50	1.37	2.36	1.07	0.48
Bayamon	3.23	0.67	1.21	0.64	1.45	1.11	2.81	1.51	1.37	2.40	1.86	0.90

TABLE 16.—The greatest daily rainfalls, in inches—Continued.

Year and station.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.
1905.												
<i>North side—Continued.</i>												
Caguas.....	1.02	0.50	1.36	0.35	1.00	2.00	4.30	1.30	2.30	1.40	0.80	2.00
Canóvanas.....	2.53	0.23	2.10	0.51	3.85	0.95	2.00	1.90	3.10	1.60	1.31	0.45
Cayey.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	2.71	1.39	0.48
Cidra.....	2.50	0.37	.....	0.40	0.86	0.35	3.18	1.86	1.42	4.10	1.72	0.64
Corozal.....	1.00	0.52	0.40	0.64	0.90	0.85	1.00	0.70	0.90	2.80	0.88	.....
Isabela.....	1.00	0.60	1.50	0.70	1.83	0.83	0.48	1.10	1.56	1.25	1.80	.....
La Isolina.....	0.58	1.53	1.47	1.00	2.15	3.00	1.50	1.24	2.10	.....	.....	.....
Manati.....	2.97	0.36	1.58	1.26	0.75	1.70	1.00	0.93	2.05	2.30	4.46	0.84
Morovis.....	1.40	0.80	1.10	1.10	1.14	.....	.....	1.90	.....	1.70	1.55	.....
San Juan.....	2.29	0.72	1.01	0.53	1.37	0.78	3.01	1.80	2.90	2.78	1.97	0.91
San Lorenzo.....	0.71	0.40	1.90	0.87	4.00	1.50	5.70	1.70	2.70	3.94	3.50	0.69
San Salvador.....	2.00	0.75	1.33	3.04	0.71	2.70	0.54	1.70	1.70	2.96	1.46	0.64
<i>East side.</i>												
Fajardo.....	1.95	0.63	1.45	0.50	3.38	0.80	1.05	3.38	1.60	3.67	1.90	0.85
Humacao.....	0.92	0.40	0.80	0.80	2.20	0.80	1.50	3.20	6.15	2.95	5.27	1.23
Maunabo.....	0.70	0.60	2.10	1.00	3.10	2.22	1.90	1.67	2.04	4.70	1.78	1.01
<i>South side.</i>												
Aguirre.....	0.49	0.22	1.40	1.06	0.47	5.96	2.90	1.26	3.54	3.63	1.89	0.76
Coamo.....	0.35	1.68	1.50	1.15	.....	.....	1.70	2.50	1.15	.....	.....	.....
Guayama.....	0.60	0.20	1.10	1.70	0.98	3.07	2.05	0.85	2.09	3.24	1.24	0.83
Juana Diaz.....	T.	T.	2.00	1.16	0.66	4.15	2.11	2.30	1.66	5.30	1.73	2.07
Ponce.....	0.05	0.01	.....	0.54	.....	.....	.....	2.08	1.77	1.42	0.67	0.36
Santa Isabel.....	1.06	0.20	0.95	1.56	1.00	3.20	2.50	0.87	2.19	3.50	1.54	0.43
Yauco.....	0.44	0.45	0.76	2.32	1.57	1.99	.....	.....	.....	.....	.....	.....
<i>West side.</i>												
Coloso.....	.....	1.43	1.41	0.76	1.66	1.83	1.64	2.40	1.12	2.19	3.79	0.06
Las Marias.....	.....	1.70*	2.20	1.37	1.52	2.64	1.68	3.60	2.06	2.40	2.90	0.54
Mayaguez.....	1.01	0.75	2.20	1.50	2.95	1.70	1.48	2.42	1.64	2.29	1.33	1.01
San German.....	0.70	0.80	0.90	1.84	1.32	2.50	0.60	1.28	2.50	4.00	1.70	0.70

NOTE: Letters indicate the number of days missing; for example, * represents one day, b two days, etc.

* Estimated.

† 7.30 inches measured; 4 inches additional estimated.

‡ Incomplete.

TABLE 17.—The average wind movement, in miles, for each hour of 75th meridian time at San Juan, Porto Rico. The means for January to June, inclusive, are based upon a five-year record, January, 1899, to June, 1903; but those from July to December, inclusive, on a four-year record, July, 1899, to December, 1902. The yearly means are based upon a four-year record, 1899 to 1902. Data taken from records of United States Weather Bureau.

Month.	0 to 1 a. m.	1 to 2 a. m.	2 to 3 a. m.	3 to 4 a. m.	4 to 5 a. m.	5 to 6 a. m.	6 to 7 a. m.	7 to 8 a. m.	8 to 9 a. m.	9 to 10 a. m.	10 to 11 a. m.	11 to 12 noon.	Noon to 1 p. m.	1 to 2 p. m.	2 to 3 p. m.	3 to 4 p. m.	4 to 5 p. m.	5 to 6 p. m.	6 to 7 p. m.	7 to 8 p. m.	8 to 9 p. m.	9 to 10 p. m.	10 to 11 p. m.	11 to mid. p. m.	For the month.
January.....	7.4	7.3	7.1	7.2	7.2	7.5	7.3	7.9	9.8	11.6	13.2	14.1	14.8	14.9	14.5	14.1	13.1	11.7	11.1	10.0	9.0	8.6	8.3	8.0	10.3
February.....	7.0	6.5	6.2	6.3	6.3	6.3	6.5	7.1	9.5	12.1	13.6	14.3	15.1	15.3	15.3	14.8	14.0	12.2	10.4	9.5	8.5	7.7	7.0	7.0	10.0
March.....	7.8	7.6	7.6	7.2	6.9	6.8	6.8	8.3	11.1	13.4	14.9	15.7	16.4	16.4	16.0	15.3	14.5	12.9	11.7	10.7	10.0	9.0	8.5	8.0	12.0
April.....	6.4	5.8	5.7	5.5	5.6	5.6	5.8	7.2	9.9	12.2	13.7	15.0	15.8	15.9	15.6	14.9	13.9	12.2	10.6	9.6	8.6	8.0	7.6	6.9	9.9
May.....	5.5	5.3	4.9	4.8	4.8	4.7	5.2	6.8	9.4	11.4	13.2	13.7	14.5	14.4	13.5	12.7	11.9	10.4	9.1	8.1	7.2	6.5	6.2	5.7	8.8
June.....	7.1	6.7	6.4	5.9	5.8	5.6	6.4	9.1	12.1	14.1	15.3	15.9	16.2	15.7	15.1	14.1	13.3	11.7	10.7	9.4	8.8	8.6	8.1	7.1	10.4
July.....	8.5	7.6	7.2	6.8	6.6	7.0	7.7	10.0	12.7	14.7	15.9	16.4	16.6	16.3	16.1	15.5	14.7	13.6	12.6	12.2	11.6	11.0	10.4	9.7	11.7
August.....	7.4	6.9	6.4	6.1	6.0	6.1	6.7	9.2	12.2	14.1	15.6	15.6	15.8	15.8	15.2	14.6	13.9	12.6	11.6	10.8	9.8	9.1	8.7	8.1	10.8
September.....	6.0	5.8	5.6	5.5	5.7	5.6	6.2	7.2	10.0	12.2	13.4	13.9	14.2	14.2	13.5	12.9	12.0	10.6	9.3	8.4	7.9	7.0	6.9	6.4	9.2
October.....	4.9	4.9	4.6	4.5	4.3	4.1	4.4	5.1	6.8	8.4	10.4	11.6	12.2	12.2	11.2	10.2	9.2	8.2	7.4	6.6	5.8	5.4	5.6	4.9	7.2
November.....	6.2	6.0	6.3	6.0	5.6	5.4	5.4	6.1	8.4	10.6	11.8	12.8	13.6	13.7	13.4	12.6	11.4	10.2	9.5	8.7	8.4	7.8	7.1	6.4	8.9
December.....	7.2	7.2	7.2	7.0	6.8	6.7	6.6	7.2	9.3	11.5	12.7	13.3	14.0	14.0	13.7	13.3	12.4	11.2	10.2	9.5	8.4	7.7	7.6	7.2	9.6
Year.....	6.7	6.4	6.2	6.0	5.9	5.9	6.2	7.6	10.0	12.1	13.5	14.2	14.8	14.7	14.3	13.6	12.8	11.4	10.3	9.4	8.6	8.0	7.9	7.1	9.7

TABLE 18.—Number of thunderstorms recorded at San Juan, Porto Rico, in each month during the years 1899 to 1905, inclusive.

Year.	Jan.	Feb.	Mar.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Annual.
1899.....	0	0	0	0	2	5	8	7	13	9	12	0	46
1900.....	0	0	0	4	4	4	4	3	7	11	3	0	50
1901.....	0	0	0	1	11	13	7	8	7	11	2	1	61
1902.....	1	0	0	1	14	9	8	6	7	7	5	4	62
1903.....	0	0	0	6	4	10	8	10	13	9	3	2	65
1904.....	0	1	2	4	3	3	8	8	6	1	4	0	40
1905.....	0	0	0	1	3	6	9	10	11	12	3	2	56
Total.....	1	1	2	17	41	50	56	57	64	60	22	9	380
Percentage.....	0	0	1	4	11	13	15	15	17	16	6	2	100

TABLE 19.—The name, location, and relative size of the principal waterfalls in Porto Rico.

Name of fall, or "salto."	River, where located.	Height of fall, in meters.	Distance between sections, in meters.	Volume between sections, in cubic meters.	Time required by floater to make run, in seconds.	Amount of dis- charge, in liters per second.	Avail- able horse- power.
Comerio.....	La Plata.....	60.0	10.0	.....	.....	2,760	1,692
Palmieri.....	Arecibo.....	41.9	.....	83.2	52.4	1,588	666
Maldonado.....	Arecibo.....	65.6	.....	99.3	60.5	1,643	1,080
Sauech.....	Arecibo.....	54.6	.....	106.9	66.4	1,609	870
Rio Blanco.....	Rio Blanco.....	140.5	12.7	106.3	174.0	611	858
Caguas.....	Loiza.....	18.5	20.0	918.0	168.6	5,444	1,007
Morones.....	Arecibo.....	30.0	15.0	128.8	66.1	1,941	582
Paso Palma.....	Caunilla.....	78.0*	.....	.....	.....	1,050*	819*
Ances.....	Arecibo.....	8.3	.....	.....	.....	2,422	202
Cayey.....	La Plata.....	15.0*	.....	.....	.....	1,000*	180*
Utua.....	Vivi.....	4.0*	.....	.....	.....	900*	36*
Santo.....	Espirita Santo.....	12.0*	.....	.....	.....	500*	60*
Collaso.....	Culebrinas.....	30.0*	.....	.....	.....	250*	75*

* Estimated.

TABLE 20.—Data relative to the principal rivers of Porto Rico.

Name.	Approximate length.	Approximate area of catchment basin.	Approximate average minimum discharge, per second.	Principal tributaries.	Cooperative stations situated in basin.
<i>North side.</i>	<i>Miles.</i>	<i>Sq. miles.</i>	<i>Cubic feet.</i>		
Sabana.....	6.2				Perla.
Rio Grande.....	9.3				None.
Loiza.....	36.7	376	1,600		Canóvanas.
Bayamon.....	29.4	114			Caguas.
Rio de La Plata.....	44.0	256	230		San Lorenzo.
Cibuco.....	15.6				Bayamon.
Manati.....	30.1	283			Cidra.
Arecibo.....	28.2	343	100	Tanamá.....	Cayey.
Camuy.....	19.3				Comerio.
Guajataca.....	18.4				Aibonito.
<i>East side.</i>					Morovis.
Fajardo.....	10.7	35			Corozal.
Rio Blanco.....	10.0	34			Manati.
Humacao.....	9.8				Barros.
Guayanes.....	13.6	44			Arecibo.
<i>South side.</i>					Utua.
Patillas.....	8.7				La Isolina.
Guamani.....	8.7				San Salvador.
Rio de la Lapa.....	10.1	71			Adjuntas.
Coamo.....	17.7	97	100		None.
Jacaguas.....	13.2	80	50	García.....	None.
Portugués.....	13.7		25		None.
Canas.....	12.2		35		None.
Talaboa.....	11.1	38			None.
Duey (Yauco).....	16.7	67			Yauco.
<i>West side.</i>					
Culebrinas.....	21.1	107	100		Coloso.
Añasco.....	35.1	194	1,000	Prieto.....	Las Marias.
Yagüez (or Mayagüez).....	9.1				Mayagüez.
Guajabos.....	24.0	135		{Rosario}	San German.
				{Viejo.....}	
				{Hocunco..}	

A NEW FORM OF PRECISION BAROGRAPH.

By C. F. MARVIN, Professor of Meteorology, U. S. Weather Bureau. Dated June 20, 1906.

Modern instrumental meteorology owes a distinct debt of obligation to Monsieur Jules Richard and his predecessors, the firm of Richard Freres, for their inventions of many forms of recording meteorological instruments. More than twenty years ago they put on the market simple and reliable forms of barographs and thermographs, at a time when simple and practical instruments of this kind for ordinary observatory use were scarcely known. These are now extensively used everywhere, and, in the meantime, have been followed by many other ingenious instruments.

Their latest accomplishment is a new type of the aneroid barograph in which the pressure of the air is balanced against a massive weight. The following translation of their own description of the instrument, which is shown imperfectly in fig. 1, fully explains its construction.

BAROMÈTRE A POIDS.

The weighted aneroid barometer.

This recording barometer of precision and great sensitiveness is based upon the aneroid principle, that is to say, upon exhausted chambers compensated for temperature. The chambers, or cells, are separately exhausted and do not contain any spring within. They are screwed together, one above the other, and the one on top is provided with a massive ring fixed to a metallic frame which is secured to the case at its extremities, and at the same time sustains the recording system in such a manner that any yielding due to the pull of the weight can have no effect on the barometric trace.

The mass required to counterpoise the air pressure on one of the barometric chambers weighs 126 kilograms, and as the cells are joined together "in tandem" the same weight suffices to counterpoise all.

In the ordinary aneroid barometer the only element lacking stability is the spring. All the errors come from this source, for, with time and changes of temperature, its elasticity undergoes modification; it weakens little by little, and the barometer tends to rise, especially in the first days of its construction. By replacing the spring by a weight, one obtains an instrument which conserves its zero point and becomes a veritable standard, easy to transport, which is not true for the mercurial

barometer. To transport the weighted aneroid it is necessary only to unhook the weight, which can be replaced at destination without any difficulty.

Another advantage in the weighted aneroid is that it registers equally seismic shocks, as well as the slow variations of the intensity of gravity accompanying the phenomena of tides. By comparing the curves of a weighted aneroid with those of a spring aneroid at the same place and regulated in the same manner, one may find in the differences some indications of the variations in the intensity of gravity.

Seismic shocks are generally so instantaneous and so feeble that they pass unperceived. The weighted aneroid records the precise hour at which they occur and, in part, their intensity, without the need of special apparatus for this purpose, such as seismographs, which are so rarely called upon to perform their function in our locality that they are almost always not in operation.

The weighted aneroid is made in two models. The one represented in the cut herewith gives a deviation on the paper of 3 millimeters per millimeter of the mercurial barometer, and is provided with a cylinder of 125 millimeters diameter making one revolution per week. The second model is much more sensitive, that is, 10 millimeters it may be, or 20 millimeters, per millimeter of mercury, and has a cylinder 303 millimeters in diameter making one rotation per day. In an instrument of great sensibility it frequently happens that the pen passes beyond the margins of the record sheet, whereupon it becomes necessary to return the pen to the middle of the sheet in order to avoid interruption of the record. Generally this may be accomplished by hand, by operating a button for this purpose, but a model is made where this operation is effected automatically by the aid of an electric motor.

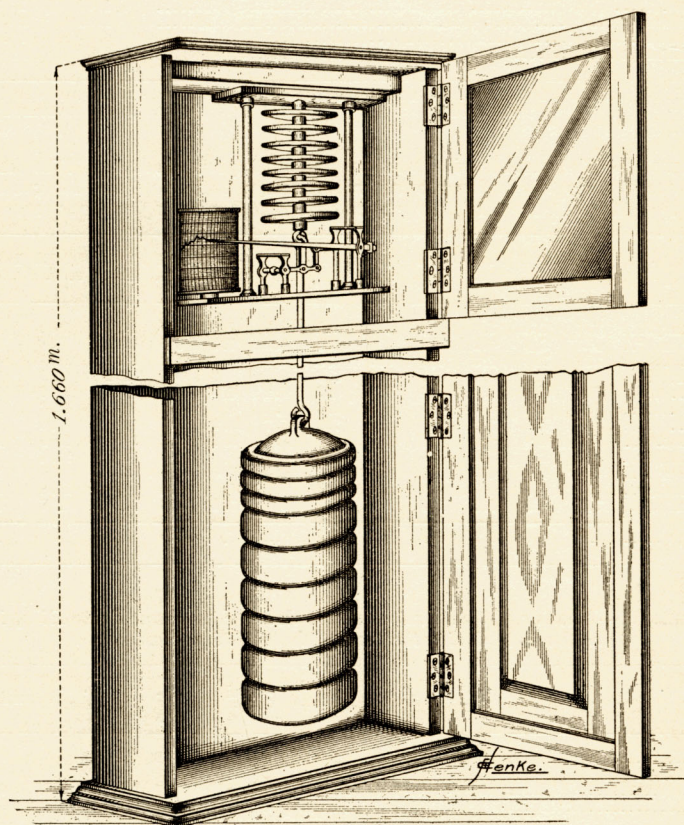


FIG. 1.—Weighted aneroid barograph. (Richard.)

The instrument thus described embodies a distinctly new departure in aneroid construction, and probably attains increased accuracy and constancy in barographs of this form. The writer is hardly prepared to admit, however, that variations in gravity can be satisfactorily shown by this instrument, or that "the only element lacking stability in aneroid barometers of the ordinary construction is the spring".

In discussing the irregular movements exhibited by aneroids the following statements were made by the writer in a previous publication:¹

It seemed to me that the real seat of the greater part, if not all of the

¹ Monthly Weather Review, September, 1898. Vol. XXVI, p. 410.